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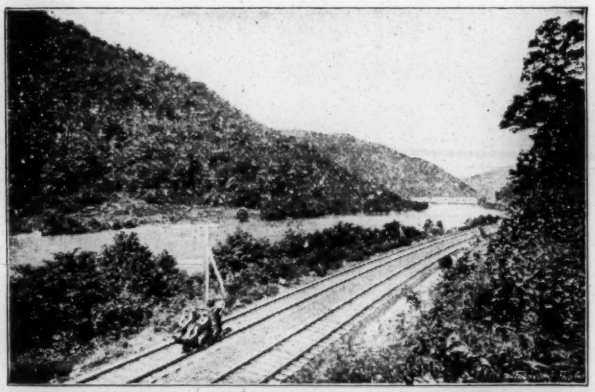

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THE
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VOL. X MARCH, 1899 No. 3

THE ORIGINAL TERRITORY OF THE UNITED STATES

By Hon. DAVID J. HILL, LL. D.,
Assistant Secretary of State

In retracing the development of our country we are led back to its infancy—to the cradle around which were already grouped the forces which have determined the destiny of the nation. We cannot too often be recalled to the rude simplicity of that earlier time or too often reminded of the elemental sources of our national life—so near to nature, so little affected by the art or thought of man.

A great continent, an unknown wilderness, rich with every gift of nature, lies waiting for the men who are to awake it from its sleep of ages, to come across the sea. Strange ships enter its bays and harbors and penetrate its broad and navigable rivers, but it still sleeps on; for the strangers come only to gather gold among its sands, not to make it theirs by pledges of honest toil. But at last are united the two essentials of a nation—a land and a people; for while the land lies waste and men are in ceaseless migration, a nation cannot exist. When land and people are wedded by permanent settlement, when man by toil evokes from nature her power to satisfy his domestic needs, and nature responds by kindling within him the flame of local affections, the wheels of society are set in motion, the economic and political forces begin their operation, and the process of national evolution has commenced.

I. THE STRUGGLE FOR THE CONTINENT

The discovery of this continent was destined to deflect all the currents of human history and to offer a home to new nations;

yet for more than a century after the voyages of Columbus there were but two settlements within the present limits of the United States, and both of Spanish origin. The Atlantic slope, whose streams flow eastward from the Alleghany mountains, abounds in safe harbors and land-locked bays, in whose restful waters the ships of the early French and English navigators found shelter after their long and perilous voyages; but the dense forest frowned beyond the coast-line, the shore seemed unattractive, and the ships sailed southward to the fabled land of gold and precious stones. It was with surprise that the early mariners skirted these somber shores barring the way to India, for they believed that north of Florida, supposed to be an island, the open sea led on to the Indian ocean.[1] A waterway across the continent was diligently sought in the belief that America, if not an island, was but a projection of Asia, and John Smith expected by ascending the James, the Potomac, or the Hudson, to emerge upon the South sea. Among his commissions was one to seek a new route to China by ascending the Chickahominy.

With the opening of the seventeenth century were planted the first English colonies in America. Humble merchants and pilgrims, wanderers going forth in frail ships to find uncertain lands, holding as their titles vague charters from King James, landed at Jamestown and on Plymouth Rock.[2] With a world to divide, monarchs were generous in those days, and did their rude surveying on the council table, using parallels of latitude and unknown seas for boundaries. It mattered little that the London and Plymouth companies were granted lands overlapping by three degrees of latitude, for as neither was allowed to settle within a hundred miles of the other, there was no danger of bad neighbors. When, to rectify all errors, the London Company received new boundaries,[3] they were described as extending two hundred miles from Old Point Comfort along the Atlantic coast in each direction, north and south, and "up into the land from sea to sea, west and northwest"—a line which was afterward held to give to Virginia the greater part of North America.

There was no contest for possession of the continent in those early days. Hudson leisurely sailed up the river which now bears his name and claimed it for the Dutch. Gustavus Adolphus, the "Snow King" of the North, without opposition, sent

[1] See Da Vinci's map of 1512-1516. This and the other maps referred to in the notes may be found in McCoun's Historical Geography of the United States.

[2] See map of King James' Patent of 1606.

[3] See map of Reorganization of the Plymouth Company in 1620.

his hardy Swedes to the Delaware peninsula. The French went fishing off the foggy coasts of Newfoundland, claimed the gulf and river of St Lawrence for their King, and built their rude huts amid the snows of Acadia. The English settlements were small and feeble communities, trembling between the sea and the wilderness. There is something sublime in the spectacle of this great unexplored continent, guarding the rich treasures of its vast interior by grim sentinels of gloomy forest, confronting with a frown that narrow, halting strip of civilization, whose frail forces, in spite of early poverty and weakness, were destined to become its imperious master. For a hundred years it seemed a most unequal contest. A handful of log-houses clustered about the fortified church, a few acres of cultivated land not far away, little groups of coarsely clad human figures laboring in the fields with rifles near at hand, the infrequent arrival of a storm-beaten ship—these were the only signs of the coming transformation which for generations met the sharp glance of the stealthy savage as he crept to the edge of the forest to observe the course of the white man's life.

The map of the Atlantic slope in 1640[4] reveals the cramped and perilous condition of the English colonies. Considered as a group, they were wholly inclosed between French territory on the one side and the sea on the other. Beginning with Acadia on the north, the French pressed upon the western limits of New England until their frontiers met those of the Dutch; then sweeping around the home of the powerful Iroquois Indians, who occupied the greater part of what is now the State of New York, New France, following the line of the Alleghanies, hemmed in all the seaboard settlements, cutting them off from the West, and stretching along the whole western boundary of Virginia until it ended in French Florida, covering the present states of South Carolina and Georgia, beyond which lay Spanish Florida and the Gulf of Mexico. While France thus stood as a barrier to the further penetration of the continent by the English, leaving them only a slender strip of coast, the Dutch and the Swedes effectually separated the northern and southern colonies from each other. To crown all, the Indians, affiliated with the French, who fraternized and mingled freely with them, were a constant menace to the safety of the English settlements, and furnished a savage band of mercenaries for advancing the ambitious schemes of France.

[4] See map of National Claims to the Atlantic Slope in 1640.

Considering the map alone, it would seem as if the French power was so intrenched upon this continent as to possess the keys of its destiny. But there are many factors which enter into the problem of nation-building, and the first of these is the temper and quality of men. The French colonies were a nursery, presided over by paternalism. The English threw their offspring out into the wilderness to fight their way for themselves, with no other heritage than liberty. In Canada the French colonist could not build his own house or sow his own seed or reap his own grain or raise his own cattle without the supervision of public officers receiving minute instructions from the home government. No farmer could visit the towns without permission or leave the colony without royal authorization. Public meetings were prohibited, initiative of every kind was forbidden, and the expression of opinion was repressed. Petted, pampered, and protected by royal authority, the French colonies were stricken with paralysis, and instead of looking to themselves became wholly helpless and dependent. When, at last, the death-struggle came in the battle for empire, the result was inevitable. Self-government, self-reliance, and freedom were foredoomed to win.

The map of 1763,[5] before the Peace of Paris, is the record of a hundred and twenty years of struggle and development, in which, with heroism, persistence, and patience the English-speaking colonists fought for and conquered space. The Dutch, tenacious of their speech and manners, having themselves absorbed the Swedes, were in turn engulfed in the English expansion, but not without leaving a deep and lasting impress upon the communities that overbore them. Brave little Holland, the first exchange in Europe for the commerce of the world, a cradle of art and science, a power upon the ocean, and an asylum and school of liberty when England sent her great thinkers across the North sea to sit at the feet of her worthy masters, has always lived, and still lives, in the Empire State and the nation. Her influence, even upon New England, is confessed by John Adams, when he says, "of all the countries of Europe, Holland seems to me the most like home."

New York, New Jersey, Pennsylvania, and Delaware completed the unbroken chain of English colonies from the lawless fishing villages of Maine to the broad plantations of Georgia. Between the sea and the mountains had grown up a solid phalanx of self-governing colonies as jealous of the French and as

[5] See map of English Colonies, 1763.

hostile to their pretensions as the mother country. The colonies of England, which in 1640 were threatened with being pushed into the sea, had become a continuous chain of eager contestants for supremacy, destined to sweep westward and drive the French dominion from the continent forever.

The French had formed a bold and magnificent design for the possession of the vast interior west of the mountains.[6] Near the close of the seventeenth century a brave and brilliant explorer, La Salle, continuing the career of Champlain, who had carried the trade and dominion of France westward to Wisconsin, descended the valley of the Mississippi, after traversing the Great Lakes, and planted a French settlement in Louisiana. The St Lawrence, the Great Lakes, the Mississippi, these furnished the natural highway for the genius of the great Frenchman in his progress toward the fulfillment of his splendid dream of empire; but the chief necessity for its realization was men, and these were wanting. At the close of the seventeenth century the French in all the wide region claimed by them numbered only twelve thousand souls, while the English had grown to a hundred thousand in New England and New York alone. "The paternal providence of Versailles," says Parkman, "mindful of their needs, sent to the colonists of Louisiana, in 1704, a gift of twenty marriageable girls, described as 'nurtured in virtue and piety and accustomed to work.'" But it required more than a cargo of girls to save New France. The forces of true colonization were wanting to the French, whose adventurers were described by an officer as "beggars sent out to enrich themselves," and who expected the government to feed them while they hunted for pearls and gold mines.

A weak chain of forts and trading posts, occupied chiefly by priests and friendly Indians, was the only bond that held together the long interval of wilderness between the St Lawrence and the Gulf of Mexico. The governor of New France, La Jonquière, perceived that the connecting link between these outposts was the rich valley of the Ohio, and demanded of his King the shipment of ten thousand French peasants to populate this intermediate region. But the thought had occurred too late; Louis was indifferent, preoccupied with the pleasures of his court; the inevitable conflict came at last and New France was erased from the map of North America.

France resisted nobly in Europe, but left the defense of her

[6] See map of the territory of the present United States during the French and Indian wars.

American empire to a handful of forces under the gallant Montcalm, while England sent 9,000 men in ships to Quebec, and the sturdy Americans, amidst great sacrifices, pushed their way through the forest to the St Lawrence to join in the attack. Upon the plains of Abraham, whose heights were scaled by superhuman daring, was fought the battle that decided the fate of Canada, and the dying Wolfe wrung from the hand of the dying Montcalm the keys of the great West and the dominion of a continent.

The destiny of America was involved in the issue of that death struggle between the paternalism of France and the forces of self-government. "The town meeting pitted against bureaucracy," says Fiske, "was like a titan overthrowing a cripple. . . . This ruin of the French scheme of colonial empire was due to no accidental circumstance, but was involved in the very nature of the French political system. Obviously it is impossible for a people to plant beyond sea a colony which shall be self-supporting unless it has retained intact the power of self-government at home. It is to the self-government of England, and to no less cause, that we are to look for the secret of that boundless vitality which has given to men of English speech the uttermost parts of the earth for an inheritance."

But it was not political causes alone that effected the annihilation of French influence on this continent. The French, the Dutch, and the Spaniards all surpassed the English in the adventurous spirit that leads to wide exploration and brilliant discovery; but the English had come with their wives and children, and they had come to stay. They loved agriculture and industry and knew the meaning of that potential word "home." They were in the best sense a sedentary people, forming attachments to the soil, and by honest labor with their own hands making it respond to their necessities. With plenty of food and boundless acres awaiting the culture of the toiler, the conditions of a great population were fulfilled. They religiously obeyed the scriptural injunction to "multiply, and replenish the earth," and brought up their numerous children to lead frugal and well-regulated lives, earning their bread in the sweat of their faces. A little later Franklin estimated that the population of the colonies doubled every twenty-five years without counting the immigrants. But it was not so with the French or the Spanish, who left behind them in the wilderness their half-breed offspring to be nurtured by Indian mothers and encounter the

hazards of a rude existence, while they themselves moved on in the path of adventure. It was the compactness of the English colonies, their industry, their frugality, and their prolific rate of increase, under the influence of home, which decided the fate of North America and made the triumph of Wolfe "the greatest turning point as yet discernible in modern history."

France emerged from the Seven Years' War defeated, humbled, and overwhelmed, her armies beaten, her navies shattered, her possessions overrun throughout the world. The purpose of the war was colonial supremacy, and it left the map of Europe practically unaltered, but the map of America was totally changed by the Treaty of Paris.[7] France was driven from the continent, and there remained to her, of all her vast possessions in America, only a few scattered islands. Spain relinquished Florida and retired behind the Mississippi. The whole area east of that great waterway, and the entire territory north of the fiftieth parallel, were united under the dominion of the British Crown. By the Peace of Paris the American continent was thus divided between England and Spain, the work of territorial consolidation under a single power between the Atlantic and the Mississippi was completed, the conditions for the development of one great nation in this vast area were supplied, and there was required to effect its formation only those measures of political reorganization which the genius of the people could not fail to accomplish.

But the chief result of the war was the birth of an American people, a distinct nationality, brought to a consciousness of itself by common interests and common sufferings. It was already a composite fabric, whose warp was of English origin, but whose woof was borrowed from every European country. The industrious German, the thrifty Swede, the sturdy Hollander, the virtuous Huguenot, the frugal Scotchman, and the generous but turbulent Irishman were already here, and all had acquired the qualities of a new and independent race. It has been said that "God sifted three kingdoms to send forth choice grain into the wilderness," but the statement is inadequate. The true motherland of America is not England, it is the whole of Europe.

II. THE TERRITORIAL CLAIMS AND CESSIONS OF THE STATES

It is an interesting fact that the year 1763, the date of the Treaty of Paris, marks also the beginning of that movement

[7] See map of the territory of the present United States after February 10, 1763. Result of the French and Indian wars.

toward independence which culminated in the Declaration of 1776. The King and the Parliament, unmindful of the great services of the colonies in the destruction of the power of France, chose to regard them as mere sources of revenue for extinguishing the enormous debt which Great Britain had incurred in extending her colonial empire. The British theory was that the colonies should pay the cost of the war. The latter, on the other hand, had made great sacrifices for the public good. The war had involved them in a large expenditure of life and money. Thirty thousand men had been killed in battle, and many of the colonies had incurred considerable debts. The imposition of special taxes upon them they considered not only unjust in principle but unwarranted by their conduct toward the British Crown, for whose glory they had bravely fought. When, in 1774, the estrangement of the colonies toward England had reached a crisis, they were thirteen separate communities, with different laws and political organizations, possessing little in common except the general use of the English language, allegiance to the same King, and the memories of fellowship in the French and Indian wars. Twenty years earlier Franklin had proposed a union for the common defense, and his telling figure of the snake severed into thirteen parts, representing the colonies, over the legend, "Join or die," in the days of the Albany convention, made an indelible impression on the popular mind. The Union, however, had never been consummated, for it was rejected by the colonial assemblies, who feared they might create a new master, and not acceptable to the English Board of Trade, because the idea was too democratic. But Franklin, who was then in England as the agent of several colonies, had written an official letter to the Massachusetts Assembly, in which he said: "The strength of an empire depends not only on the union of its parts, but on their readiness for the united exertion of their common force;" and, to secure this end, he proposed that a general congress be assembled to make a solemn assertion of the rights of the colonies and to engage them with each other never to grant aid to the Crown in any general war till those rights were recognized by the King and both houses of Parliament.

Accordingly a Congress, styling itself "*the delegates appointed by the good people of these colonies*," assembled at Philadelphia on the 5th of September, 1774. There was no law or precedent for such a union, and it was not even pretended that the colonial assemblies had the legal right to unite without the consent of

Parliament, and as if in some measure to break the force of this illegality, the delegates had assembled in the name of "the people." It was, in effect, the declaration of a new sovereignty. Patrick Henry justified it on the ground that the "colonial governments were at an end;" that "all America was thrown into one mass and was in a state of nature." "Where are your landmarks, your boundaries of colonies?" said he. . . . The distinctions between Virginians, Pennsylvanians, New Yorkers, and New Englanders are no more. I am not a Virginian; I am an American." His theory was premature, however, for Congress had not been appointed as direct representatives of the people, but as committees of organized colonies which had not yet thrown off allegiance to the British Crown; but his words were prophetic and forecast the philosophy which the Declaration of Independence was soon to assert as the expressed conviction of the nation. The tendency of public thought, however, outstripped the progress of events; and, believing the delegates to represent the whole territory claimed by the British Crown in America, the people spontaneously named the assembly the "Continental Congress." To the popular mind the revolution had become the revolt of a continent against the oppression of an island. When Colonel Ethan Allen demanded the surrender of Fort Ticonderoga "in the name of the Great Jehovah and the Continental Congress," he uttered the whole philosophy of the American Revolution.

It soon became apparent that the colonists, to whom their King and Parliament denied the rights of Englishmen, were in fact reduced to "a state of nature," and the idea of Patrick Henry gained ascendancy. The logical result was the abandonment of all allegiance to the British Crown by the Declaration of Independence.

Ten days before the adoption of the Declaration, Congress had resolved that "all persons abiding within any of the united colonies, and deriving protection from the laws of the same, owed allegiance to the said laws and were members of said colony." Thus the same power which declared independence gave to the colonial governments all the authority which they possessed. The colonies owed their existence as independent commonwealths, not to their own separate acts and achievements, but to the united action of all combined. Whatever sovereignty they subsequently claimed was wholly derived from the union between them. Alone each colony was but an empty name;

together they were a sovereign power. It was as a continental force that the people won their independence, and the Nation is in reality older than the States.

All this was felt even at the moment, and on the day the committee for drafting the Declaration of Independence was appointed another committee was directed to prepare the form of a confederation. The power which declared independence and thereby created new sovereignties knew itself to be a mere illusion, except as its acts were ratified by the force of the united nation.

But when the Declaration had in effect brought into being thirteen sovereigns in place of one, new problems burst into view. Each of these new states claimed all the rights granted by its own fundamental laws, and in addition its share of the power hitherto accorded to the Crown. What, then, was to be the disposition of those "Crown lands" which were not within the actual bounds of any colony, although originally included in their charters—that vast territory lying between the Alleghany mountains and the Mississippi, which had been won in battle from the rule of France?[8]

Six states—Massachusetts, Connecticut, New York, Virginia, North Carolina, and Georgia—by reason of their original charters or subsequent treaties, claimed the ownership of all the lands west of their actual boundaries as far as the Mississippi river. It is true that a royal proclamation had been issued in 1763 prohibiting colonial governors from granting patents of land beyond the sources of the rivers flowing into the Atlantic, and that in 1774 the "Crown lands," as they were called, northwest of the Ohio were annexed to the royal province of Quebec; but these were considered by the colonies unjust encroachments, for had they not freely sacrificed lives and money to conquer this same country from New France? The other colonies, however, hemmed in by inelastic boundaries, protested against these large pretensions, maintaining that possessions which had been acquired by the force and sacrifice of all should not be appropriated for the aggrandizement of a part. New Hampshire, Rhode Island, New Jersey, Delaware, Pennsylvania, and Maryland, denied a share of this great territory, saw in the claims of the "land states" not only an evident injustice in refusing them a part in the fruits of a common victory, but a menace to the equilibrium of the states by the arrested development of some

[8] See map of Land Claims of the Thirteen Original States.

and the unlimited expansion of others. It was indeed no imaginary danger, for by offering free lands to settlers the larger states could easily depopulate the smaller. Silas Deane, who had been sent as commissioner to France, had suggested that the Northwest Territory was "a resource amply adequate, under proper regulations, for defraying the whole expense of the war." When, therefore, in September, 1776, a resolution of Congress offered a bounty of land to soldiers enlisting for the war, Maryland, seeing that Congress had no land to give and she herself none to contribute, perceived that the states without land would be compelled to buy it of those whose stock was unbounded and at their own price, thus impoverishing themselves and enriching their rivals.

Virginia in her constitution maintained her charter claims, which if allowed would have made her a mighty empire, greater when developed than all the other states combined. On the 30th of October, 1776, Maryland passed a resolution asserting that Virginia's title had "no foundation in justice, and that if the same or any like claim is admitted, the freedom of the smaller states and the liberties of America may be thereby greatly endangered," and expressed the conviction that, the dominion over those lands having been established by the blood and treasure of the United States, "such lands ought to be considered a common stock, to be parceled out at proper times into convenient, free, and independent governments."

Thus by the foresight of Maryland, to which all honor will be forever due, was first posed the momentous question upon whose decision hung the whole harmonious system of government which we now enjoy. A year later, and a month before the Articles of Confederation were proposed for ratification, it was moved in Congress "that the United States in Congress assembled shall have the sole and exclusive right and power to ascertain and fix the western boundary of such states as claim to the Mississippi or South Sea (meaning the Pacific), and shall lay out the land beyond the boundary so ascertained into separate and independent states from time to time as the numbers and circumstances of the people may require." Only Maryland, battling for this great and fruitful idea and appealing to the wisdom of the people as against the ambition and avarice of the states, voted in the affirmative; but a principle had been laid down whose wisdom was eventually to be perceived by all—a principle which has proved the keystone of the Union, supporting the splendid arch upon which our local liberties and national power now rest.

In 1780 New York authorized the limitation of her western boundaries and the cession of her vacant lands to the United States. "She ceased to use the language of royal grants and discarded the principle of succession. She came forth from among her parchments into the forum of conscience in presence of the whole American people, and recognizing the justice of their claim to territories gained by their common efforts, to secure the inestimable blessing of union, for their good and for her own, she submitted to the national will the determination of her western boundaries, and devoted to the national benefit her vast claims to unoccupied territories."

Nor can we deny to all the states a share in the honor of a wise and noble compromise. For the consummation of the Union the smaller states intrusted their liberties to the keeping of the greater, and the greater, in a spirit of generosity, finally bequeathed their large inheritance to the common good, and shared the luster of a brilliant destiny with new stars yet to rise in the firmament of liberty. Special praise should be accorded to Virginia, for "in her great cession of the territory northwest of the Ohio, the greatest cession of territory in the history of the world ever voluntarily made by a powerful state able to defend it, she invited the other states to follow her example, and thus made possible the local governments and magical development of the West, while she averted the jealousy, and possibly the anarchy and bloodshed, that might have followed the assertion of her claims."

III. THE NEGOTIATIONS WITH GREAT BRITAIN

When the long struggle for independence was concluded, it was not to be doubted that the young Republic would hold out with stubborn insistence for the recognition of its sovereignty over the territory east of the Mississippi. After the battles of the war, which ended with Yorktown, came the battles of diplomacy, which were to be fought with an equal skill and daring. All the glory and pride of colonial supremacy which had animated Great Britain when the Treaty of Paris was made with the French were now to be disputed by the colonies themselves.

Instructed to claim the whole of the territory south of the St Lawrence and east of the Mississippi, Franklin proposed, in addition, that England should voluntarily cede Canada, in order that its lands might be sold to raise a fund for the compensation of Americans whose property had been destroyed; to which Lord

Grenville wittily rejoined that he could not perceive what motive England had for giving away a fourteenth province because she had already lost thirteen.

Although the commissioners had been directed to observe the most perfect loyalty to France, and to rely implicitly upon her counsels, we now know that the most moderate territorial pretensions of the United States had not one friend in Europe. Spain was represented at the French court by the Count d'Aranda, a subtle diplomatist who bore no love to the young Republic of the West. Fearing alike future encroachment upon the territory of Spain and the dangerous contagion of republican principles, with which her American colonies had already become infected, he made preposterous claims for his country and pretended that the West was the territory of free and independent nations of Indians, whose sovereignty over their soil should be considered inviolable. Sustained by such flimsy reasons, he proposed to shut the United States between the mountains and the sea, interposing a vast Indian territory between them and the Mississippi and permitting Canada to extend south to the Ohio river.[9]

Bound to Spain by an ancient family alliance and a secret treaty which made the cession of Gibraltar back to Spain the price of peace with England, France proved the mere advocate of her ally and client. The Count de Vergennes, the able but evasive Minister of Foreign Affairs, had secretly instructed the envoys of France to the United States to oppose by every wile known to the art of diplomacy the American acquisition of Canada, while yet pretending to favor American expansion. Rayneval reports, in great glee, as we now read in his dispatches, how successfully he hoodwinked the President and certain members of Congress, beguiled by his craft and the sweet influence of their tobacco pipes, and won rapturous expressions of gratitude from the Spanish agent Miralès. "It is a part of the system of Spain, as it is also of France," writes Vergennes, "to maintain the English in the possession of Nova Scotia and Canada." During the negotiations he says the same to Luzerne, and adds that, of course, "this fashion of thinking should be an impenetrable secret for the Americans."

We are not surprised, therefore, that the French court sustained the idea of Aranda,[10] and desired to crush the United

[9] See map of boundary lines discussed at Paris, 1782.

[10] See map of Boundaries of the United States, Canada, and the Spanish Possessions, according to the Proposal of the Court of France, 1782.

States by massing to the westward the Spanish, the Indians, and the English, leaving the territory of the colonies only a narrow fringe pendant to the broad snowy mantle of the Dominion of Canada, torn from its own shoulders in 1763, and perhaps with the dim hope of its ultimate recovery amidst the strange international vicissitudes that attend defeat and victory. Regarding the fisheries as "a great nursery for seamen," and seeing in them a school for ultimate supremacy on the ocean, France joined England in seeking to deprive the colonies of their hereditary rights on the banks of Newfoundland and in the Gulf of St Lawrence. The keen vision of Vergennes foreknew the future struggle for the Mississippi valley and the possession of the Far West, and, faithful to Spain, he ridiculed "the extravagance of the American views and pretentions," and called the demands of John Jay "a delirium not to be seriously refuted."

Happily for their country, the American commissioners saw a way to peace without sacrificing the interests of their people, and although threatened with a vote of censure in Congress for their independent action and disregard of French counsel, they were brave and wise enough to maintain every just demand. The Treaty of Versailles not only acknowledged the independence of the United States, secured the rights of the fisheries, and opened the free navigation of the Mississippi, but it confirmed substantially the American claims in the matter of boundaries and won a vast territorial empire for the United States.[11] It was one of the greatest victories in the history of diplomacy and laid the foundation of the nation's greatness. The Great Lakes and the Mississippi became American highways, and the path to the Gulf of Mexico and the Pacific was opened to American enterprise. The peace was received "with a burst of approbation" in the United States, and the refrain was taken up—

> "No pent-up Utica confines our powers,
> The whole unbounded continent is ours."

The completeness of the victory was resented by Spain, compelled to take Florida in place of Gibraltar, and regretted by France, which got nothing at all. The baffled Aranda wrote to his King: "This Federal Republic is born a pigmy. A day will come when it will be a giant—even a colossus—formidable to these countries. Liberty of conscience, the facility of establishing a new population on immense lands, as well as the ad-

[11] See map of the Original Public Domain, 1787.

vantage of the new government, will draw thither farmers and artisans from all nations." Montmorin, the successor of Vergennes, wrote to his envoy: "It is not advisable for France to give to America all the stability of which she is capable; she will acquire a degree of power which she will be too well disposed to abuse." But that was written before the French revolution and from the shadow of a tottering throne. From our great sister republic of today we would receive a different greeting, and among its words of amity would be expressions of gratitude for the principles and example of the United States, which have done so much toward the establishment of the French Republic.

IV. THE INFLUENCE OF THE NATIONAL DOMAIN

A cool and temperate Englishman, "a far-sighted man in many things," wrote of the prospects of the Confederation soon after the peace: "As to the grandeur of America and its being a rising empire under one head, whether republican or monarchical, it is one of the idlest and most visionary notions that ever was conceived, even by writers of romance. The Americans can never be united into one compact empire under any species of government whatever; a disunited people till the end of time, suspicious and distrustful of each other, they will be divided and subdivided into little commonwealths or principalities, according to natural boundaries, by great bays of the sea and by vast rivers, lakes, and ridges of mountains."

The events of the time seemed to justify this dismal prophecy, and the fear of its fulfillment agitated the best minds among the American patriots. The vast Northwest Territory having been ceded to the United States by Great Britain, the question was, How was it to be held? Congress instructed General Washington to garrison the frontier posts, when surrendered, with the continental troops; but after long and elaborate debates the danger of confiding so much power to the federal government was made the excuse for disbanding the troops and leaving the frontiers to the protection of a few state militia. To the ambitious and jealous leaders in the states, anxious to rise to power in their narrow sovereignties, the utility of the Union seemed already passed, and the destiny of America appeared to be wrapped up in the fate of thirteen rival republics, each too feeble to protect itself against foreign aggression and all too suspicious to trust one another. The impotent bond of the Confederation became the

laughing-stock of Europe. To many it seemed that a return to the protection of England was the only way of salvation, for the paper money had become worthless, the fires of local insurrection burst forth from the ashes of discontent, interstate commerce was destroyed by petty frontier exactions, and the great experiment of independence seemed doomed to end in anarchy.

We cannot here review the disquiet and anxiety of that troubled time, and can only briefly indicate the unexpected cure. The possession of a national domain, composed of territory ceded by the states to the Confederation, proved to be the anchor of the Union. Over this area Congress had assumed a certain degree of power, and it was the only sphere in which the sovereignty of the Confederation could assert itself. In the vast unpopulated stretches of the great Northwest, Congress, by the ordinance of 1784 and the later ordinance of 1787, exercised the right of eminent domain, ruled by its laws, and sold the land to obtain an income. The future states were bound to make their laws in harmony with the great principles of freedom, education, and suffrage laid down by Congress, and under no circumstances could they ever be separated from the Union. "I doubt," says Daniel Webster, "whether one single law of any law-giver, ancient or modern, has produced effects of more distinct, marked, and lasting character than the ordinance of 1787."

Thus grew up silently, almost unobserved, yet, as Madison remarked, "without the least color of constitutional authority," a national sovereignty which justified recognition at last by the formation of the Constitution. The Articles of Confederation had contemplated no such exercise of power, and the ordinance was never submitted for ratification by the States; but the necessity of governing that vast territory had forced upon Congress a course as wise as it was illegal, until, as by a sudden turn in a mountain path a splendid landscape bursts into view, the great and impressive fact that a nation had been created commanded attention; and, seeing its sublime significance, confessing its rightful claims, the whole people felt their kinship and unity, and could express their conviction in the potent phrase, "We, the people of the United States."

The treaty of 1783 stipulated that the navigation of the Mississippi from its source to the ocean should be forever free and open to the citizens of the United States. Spain, however, who was not a party to this agreement, asserted an exclusive control over the river and denied the right of free navigation. This situa-

tion gave rise to one of the most thrilling controversies in the history of our country, now almost forgotten, but fraught with momentous consequences to the future of the American people. Franklin had foreseen the issue when he said to Jay, "Poor as we are, yet, as I know we shall be rich, I would rather buy at a great price their right on the Mississippi than sell a drop of its waters. A neighbor might as well ask me to sell my street door."

Soon after his retirement from the army, Washington made a tour into the western country, which he had known so well in his early days and whose wealth and value he justly appreciated. His purpose was to ascertain by what means it could be most effectually bound to the Union. The population of that rich and fertile region, a bold and adventurous class, separated by the remoteness of their position from connection with the eastern states, with little respect for the feeble rule of Congress, in which they had no representation, already showed signs of estrangement and independence. So rich a soil, such luxuriant vegetation, had never belonged hitherto to any branch of the English-speaking race. Plains capable without cultivation of supporting millions of cattle, fields golden with heavy harvests in response to the minimum expenditure of toil, rivers affording great natural highways for the movement of their agricultural productions needed only an adequate market to render the great Northwest the richest portion of the globe. The Atlantic states knew little of this vast region or its untold resources. They looked upon it chiefly as a means for paying the federal debts by the sale of public lands, and did not realize its political significance until their indifference and the inefficiency of the government had almost lost it to the Union.

Washington, whose large practical intelligence was so quick to discern great issues, saw the impending danger. Returning from his western journey, he recommended the appointment of a commission to make a survey ascertaining the means of natural water communication between Lake Erie and the tidewaters of Virginia. His project was to open all the possible avenues between the western territory and the Atlantic, thinking thus to identify the interests of the two sections, to offer to the West participation in the advantages of the sea and to enrich the East by making it the emporium of the western productions. But the shrewd frontiersmen who had taken up the western lands saw another avenue to the sea and another way to market. It was

the Mississippi and the tributaries flowing into it which seemed Nature's great highway ready for their use. Only one barrier opposed them, the obstinate refusal of Spain, who held the mouth of the great river and its western bank, to permit its free navigation. An interposition so autocratic, so unjust, and so injurious roused the resentment of the strong men of the West and they resolved not to submit to this limitation of their rights. The East, fearing that the West would be lost if not held to its eastern connections, opposed the opening of the Mississippi, preferring a commercial treaty with Spain to free navigation. Congress met the problem with the feebleness that characterized its action after the Revolution. Diplomacy was bartering away the rights of the young West, when suddenly a trader, whose shipment had been seized by the Spanish authorities, returned to tell the story of his wrong just at the moment when news arrived that Congress intended to surrender the present use of the Mississippi. The whole population of the western settlements rose in wrath and indignation to protest against the folly by which they were being sacrificed. Looking out over their magnificent domain, whose soil they were redeeming from the idleness of its natural state, they felt that their abundance was turned to poverty if the mighty rivers which swept past their fields waving with harvests abundant to sustain the populations of Europe, were closed to them, and they themselves shut up in their fertile valleys, unable to exchange their wealth of cereals for the merchandise they could not create. But there at the outlet of their noble river stood the obstinate Spaniard, sword in hand, refusing them egress to the open sea and excluding them from the commerce of the world. They must despoil their luxuriant valleys to pour their tribute at his feet, and share with an alien and an enemy, "the largest return which American labor had yet reaped under the industry of its own free hands." No; they would not. They had fought the savage and the wild beast. They had come here to accept their heritage from the hand of nature and to find justice without relying on the power of kings. They must go to the sea. If Congress opposed, it was to be defied, as the Crown of England had been in the Revolution. If the Spaniard opposed, they would drive him off the continent and rid the land of an incumbrance. They set their faces like flint for the empire of the West. Twenty thousand men, trained in the field and the forest, turned their backs to the

Alleghanies and their faces toward the great river, resolved to march to its mouth and drive the Spaniards into the sea.

Congress could not deny their plea, and yet was not strong enough to espouse their cause. The need of a closer union in place of "the rope of sand" which bound the states together became evident. The great Northwest must be saved. A new vision burst upon the American people. "A great and independent fund of revenue," said Madison, "is passing into the hands of a single body of men who can raise troops to an indefinite number and appropriate money to their support for an indefinite period of time. . . . Yet no blame has been whispered, no alarm has been sounded." Since, then, there already existed in the Union a form of sovereign power, why not give it substance? Why not provide the nation with an adequate constitutional basis? Under these circumstances was convoked the Constitutional Convention of 1787.

The lands between the Alleghanies and the Mississippi were seen to be the key to the continent. They were the old vantage ground of France. Emigration was setting toward them and in a few years they would constitute a mighty empire. They belonged to the people, not to the states, and the common possession bound the whole population together in a corporate interest. The discernment of this momentous fact created a new patriotism and flooded the intelligence of the people with a new light. Henceforth there were to be two kinds of government to correspond to the two kinds of interest that existed—that of the States, preserving their memories, their traditions, and their organizations, and giving perpetuity to their laws and liberties, and that of the Nation, binding them all together in indissoluble union, preserving the common heritage of their people, giving them fraternity at home and prestige abroad, sweeping away the local barriers to trade and intercourse, gathering the whole people under the folds of one glorious flag, and sheltering the sister states under the spacious dome of a common nationality whose protection should extend over all alike.

No wonder that the Constitution has been called "the finest specimen of constructive statesmanship that the world has ever seen." It has a character of universality about it like the great laws of nature. It was compacted of historic liberties won in a thousand battles and rendered sacred by colonial memories and revolutionary struggles, yet was made for indefinite growth and future expansion, in view of vast stretches of unoccupied wilder-

ness threaded by mighty rivers destined to bear upon their bosoms the commerce of untold millions when these trackless wilds should be peopled by the makers of the Great West. The history of the United States is the story of its continued benedictions. Ampler vision has broadened the interpretation of its meaning, and enlarged experience has widened the application of its principles; and today, as hitherto, the Constitution is flexible enough to admit of adaptation to all the changing conditions of our national development, yet strong enough to hold in one harmonious system forty-five great states, spanning the continent and including within their limits every diversity of nature and every variety of man. Designed for a population of three millions, it has become the fundamental law of more than seventy; ratified by a little fringe of people scattered along the Atlantic seaboard, it is accepted by a great continental nation; written in a period of legalized slavery, it has laid the foundations of universal liberty; expressing the final goal toward which political evolution is tending—local government for local affairs and a general government for general affairs—it presents a model for the final organization of the entire human race, when some far-distant dawn shall usher in

"The parliament of man, the federation of the world."

In a recent report to the Department of State, Consul-General De Leon deals at some length with the proposed railway from Guayaquil to Quito. The track is laid for the first 60 miles, but the broadening of the gauge and the laying of new ties and rails will almost amount to a new construction. The present terminus is at the foot of the western cordillera of the Andes, at an elevation of 1,130 feet above sea-level. Between this point and Sibambe, a distance of 60 miles, there will be a gradual rise to an altitude of 8,138 feet. This is considered to be the most difficult part of the entire line, as not only does it lie for the most part on the thickly forested mountain side, but the geological formation will add greatly to the difficulty of construction. Between Sibambe and Quito the line will have to surmount three spurs of the cordilleras, ranging from 10,000 to 12,000 feet. The road, as a whole, will be a triumph of railway construction and will open up a region of wonderful productivity, the mountain valleys that will be rendered accessible possessing a fine climate and an exceedingly fertile soil.

PORTO RICO*

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CONFIGURATION AND GEOLOGY

Porto Rico is the most eastern and the smallest of the Great Antilles, being 500 square miles less in area than Jamaica. It is 95 miles long, 35 miles wide, and has an area of 3,668 square miles.† The coast-line is about 360 miles in length. Its area is 300 square miles greater than that of Delaware, Rhode Island, and the District of Columbia combined, and 300 square miles less than that of Connecticut. At the same time, it is the most productive in proportion to area, the most densely settled, and the most established in its customs and institutions. It is also notable among the West Indian group for the reason that its preponderant population is of the white race, and that it produces foodstuffs almost sufficient to supply its inhabitants as well as some of the neighboring islands.

MOUNTAIN SCENERY NEAR LARES

* Published by permission of the Chief of the Division of Forestry of the Department of Agriculture and the Director of the Geological Survey, under whose auspices the researches upon which this article is based were made.

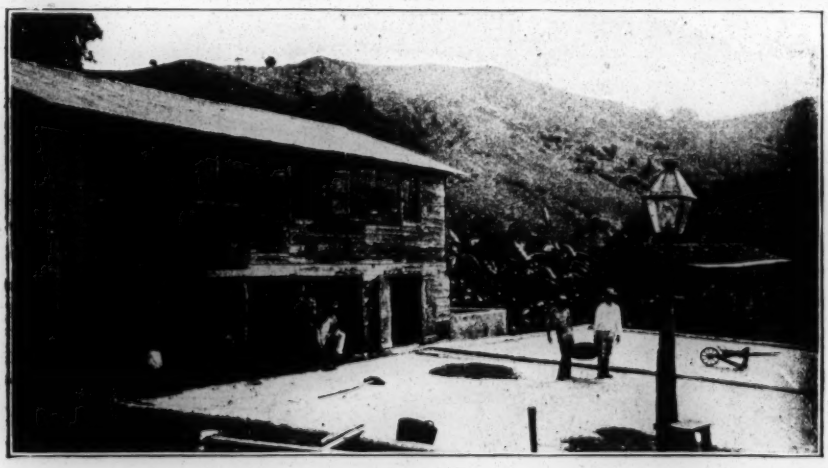
† The area of the island cannot be stated exactly. Some authorities give slightly different figures from the above.

Although it nowhere attains the great altitudes of the other Antilles, the island is practically the eastward continuation of the Antillean chain of uplifts. It rises from the shallow submerged bank which borders it for a few miles and is a continuation of the other Antilles. This bank is the upward extension of a remarkable submerged mountain slope, which, at least on the north side, descends nearly 30,000 feet to the bottom of the Brownson Deep, until recently supposed to be the deepest hole in the world.

Its outline presents the appearance of an almost geometrically regular parallelogram nearly three times as long as broad, with its four sides following the four cardinal directions. The sea-line, unlike that of Cuba, is almost straight, and the coast is usually low, especially on the southern side, although there are a few headlands. It is also void of fringing keys and deep indentations of its coast, such as border the island of Cuba.

Porto Rico, like all the Antilles, in comparison with the United States, has a configuration ancient in aspect, although comparatively new in geologic age, the material all being of late Cretaceous and younger periods. Of the four chief topographic features of the Great Antilles—central mountains, coast-border topography, interior plains, and inclosed mountain basins—only the central mountains and coast-border topography are represented upon this island.

The central mountains, which are the largest conspicuous eastern member of the partially submerged chain of the Great Antilles



COFFEE ESTATE IN MAYAGUEZ DISTRICT

A MOUNTAIN STREAM, SIERRA LUQUILLO

and Virgin islands, are largely of one general physiographic type, while the coast-border topography is more complex and diversified, consisting of three subtypes, which may be called coast hills, parting valleys, and playa plains.

The mountains constitute the major surface of the island, approximately nine-tenths of the whole. The other features collectively make an irregular and lower lying belt around the coastal margin comparable to the narrow rim of a high-crowned alpine hat. In fact, the whole island is practically an elongated elevated sierra, made up mostly of volcanic rock, surrounded by a narrow collar or dado of limestone hills, formerly marginal marine incrustations which have been elevated. Viewed from the sea these mountains have a rugged and serrated aspect, consisting of numerous peaks and summits void of a definite crest line, rising from a general mass whose steeply sloping sides are deeply corrugated by drainageways, so that they have the aspect of a wrinkled handkerchief—a figure of description ascribed to Columbus in telling Queen Isabella of the Antilles. Their superfice has been etched by erosion into innumerable gabled lateral ridges (cuchillas) separated by deep V-shaped gorges. This type of mountainous configuration has been described by Davis as a dissected range, while the angular lateral ribs or salients are known in Cuba as cuchillas (knives).

This sculpture is so peculiar to the central mountains of the island that it forms a ready means of differentiating them from the foothills. The mountain region has a long and relatively gentler inclination toward the north coast and falls off more ab-

STREAM AND VOLCANIC ROCKS, MAYAGUEZ

ruptly toward the south. While the general axis of uplift extends east and west, the mountains do not now present a well-defined and continuous summit crest, although various terms are popularly used indicating a feature such as the "central backbone range," etc. The chief approach to such an axial feature is an irregular line of summits which can be drawn about two-thirds the distance across the island from east to west between the headwaters of the streams flowing to the north and south coasts. This feature, however, which follows more nearly the southern than the northern coast, is a line of separated peaks and passes. High peaks exceeding in altitude this so-called divide project at various places from the lateral ridges which extend between the parallel streams flowing from this drainage divide.

The main crest line extends from Mayaguez on the west through Aibonito and Adjuntas to Humacoa on the east. This is called the central Cordillera west of Aibonito and the Sierra de Cayey to the east of that town. Another crest line bifurcates from this main ridge near the center of the island like a letter ≺, so that there are practically two crest lines in the eastern half of the island. This northern branch is the Sierra Luquillo, which practically extends from westward of the San Juan-Ponce military road to the northeast cape. This range, which decreases in altitude to the westward, contains the highest island summit, El Yunque, and is nearly separated from that of the Sierra Cayey by the valleys of the Rio Guarabo, which flows west into the

Loiza, and the Rio Naguabo, which flows east into the Anegada passage. The summit lines of the two sierras merge near Barranquitas, near the geographic center of the island.

More accurately speaking, these mountains as a whole, when looked down upon from the highest points, present the aspect of a sea of conical peaks and beaded ridges, rather than a dividing ridge, from which angular laterals extend between the drainageways. They rise abruptly from the sea, especially at the east and west ends of the island, or from the narrow marginal plain which separates them from it.

The highest eminences of this billowy sea of summits nowhere exceed 4,000 feet, and this altitude is reached by only one peak, that of El Yunque at the extreme northeast. The height of this is given on the Spanish maps at 4,087 feet, but it is reported much lower by other authorities, with a minimum estimate of 3,200 feet. The summits of the remainder of the island, although numerous, nowhere attain much over 2,800 feet, as shown in the following table:

ALTITUDES OF TYPICAL MOUNTAIN STATIONS IN PORTO RICO[1]

Altitudes of the Sierra Luquillo

	Feet
El Yunque,[1] eastern summit	3,752
El Yunque,[1] western summit	3,790
Divide north of Juncos (about)	2,400
The hill of the Guaraguo (Rio-piedras to Caguas), military road[2]	685
Las Calabazas (culminating point from Rio Pedro to Caguas)[2]	866

Altitudes of Points in the Sierra Cayey (that portion of the main Cordillera east of the San Juan-Ponce road)

	Feet
Caguas, plaza, in the Caguas basin, separating the Yunque and Cayey sierras and draining into the Loiza[2]	246
House of Vicente Pico (from Caguas to Cayey)[2]	1,525
Culminating point between Caguas and Cayey (watershed)[2]	1,682
El Torito, south of Cayey[4]	2,735
Torito, culmination of Sierra Cayey, south of Cayey[1]	2,819
Sierra de Cayey, level of the calcareous platform of Cayey[2]	2,223
Hacienda la Julia de Loris[2]	1,400
Summit which overlooks Cayey and from which the city can be seen to the south-southeast[2]	2,542

[1] Compiled by U. S. Coast and Geodet c Survey, as published on its map.

[2] Chart of Saint Claire-Deville, published in Historia Civil Natural de la Isla de Puerto Rico, edition of 1866, pp. 427, 428.

[3] Aneroid measurements, by Mr H. M. Wilson and the author.

[4] Map of Don J. M. Lago, Mayaguez, 1898.

	Feet
Culminating point between Cayey and La Cidra[2]	1,781
La Cidra (Presbiterio)[2]	1,423
Cayey, level of the plaza[2]	1,351
Sierra de Cayey, culminating point of the route from Cayey to Guayama[2]	2,810

Altitudes of Points in the Cordillera Central (the extension of the main Cordillera west of the San Juan-Ponce road)

	Feet
La Torre, between Aibonito and Barranquitas[1]	1,130
La Torre (The Tower) pass between Barranquitas and Aibonito to the west-northwest of the latter.[2] According to Saint Claire-Deville, the summit of this mountain is next highest after Yunque, and attains at least 1,000 meters (3,280 feet)	2,456
Summit west of Aibonito (1 mile)[1]	3,280
Aibonito, house of Domingo Torre[2]	2,066
Adjuntas[3]	1,440
Adjuntas, house of D. José Bosch[2]	1,640
Divide south of Adjuntas[3]	2,350
Culminating point between Ponce and Adjuntas, summit of this district[2]	2,617
Plain at the summit of Adjuntas on road to Peñuelas[2]	2,810
Culminating summit of district of Peñuelas[2]	2,812
Mata de Platano, northwest of Ponce[4]	2,812
Cumbre Guilarte, southwest of Adjuntas[4]	2,625
Guilarte[1]	3,608
Barranquitas, home of Bonocio Ferrer[2]	2,082
Culminating point between Sabana del Palmar and Barranquitas[2]	2,260
Sabana de Palmar (Presbiterio)[2]	757
Cumbre de Asomante[2]	2,089
Tetos de Cerro Gordo (due north of Sabana Grande)[1]	2,625
Tetos de Cerro Gordo[4]	2,235
Summit of the hill situated to the east of Mayaguez[2]	708

Through this mountainous mass the numerous and copious streams of the island, ramifying in every direction, have cut deep valleys, singularly free from cliffs, but of the V-shaped type, and etching the surface into many Λ-shaped lateral ridges and points. Of these streams the largest and longest drain into the north coast, the next largest flow to the west, while the streams of the south and east sides, although copious, are comparatively short. The headwaters of the three principal rivers of the north coast, with upper ramifications, have nearly reached across the island in a southward direction. The easternmost of these is the Loiza, which rises only eight miles north of Arroyo on the south coast; the Rio de la Plata, which rises the same distance north of Guayama and reaches the north coast near the central meridian

of the island, and the Rio Grande, which rises twelve miles north of Ponce, near Adjuntas, and empties into the sea near Arecibo.

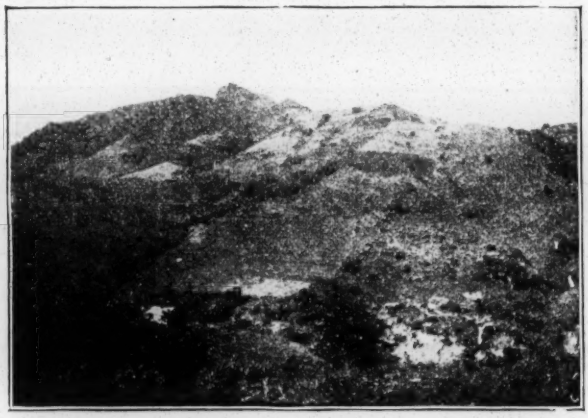
Besides the wide alluvial plains near their mouths, to be described later, the lower stretches of these northeast streams present somewhat large areas of bottom land extending for considerable distances within the margin of the mountain area, rarely broadening out into local circular mountain valleys, but their upper portions are steep angular V-shaped gorges (quebradas), where habitations are confined to the slopes and not the valleys. There are other streams of the island which also present small areas of bottom land indenting the mountainous area for a very short distance from their coastal borders, notably the Portugues near Ponce on the south and the Añasco on the west.

The demarcation between the rugose-angular topography, the soils, and the geologic features of the coastal belt of the central mountain regions is well defined, and the most unobservant traveler can but remark the radical natural differences which take place upon passing from it into the lower-lying coastal plains and foothills, especially upon the south side.

On the west side of the north coast there are some exceptionally high hills which extend back as far as Lares and San Sebastian, and which might be considered truly mountainous, owing

MOUNTAIN CULTIVATION NEAR MAYAGUEZ

to their high elevation (1,200 feet) along their interior border and the fact that they are a part of the general mountain uplift. Along their inner border these are of remarkable pointed character, known in Jamaica as "cock-pits" ("Farallones" in Spanish nomenclature), and are appropriately termed by the natives "Pepinos" or cucumbers. These are numerous sharp-pointed



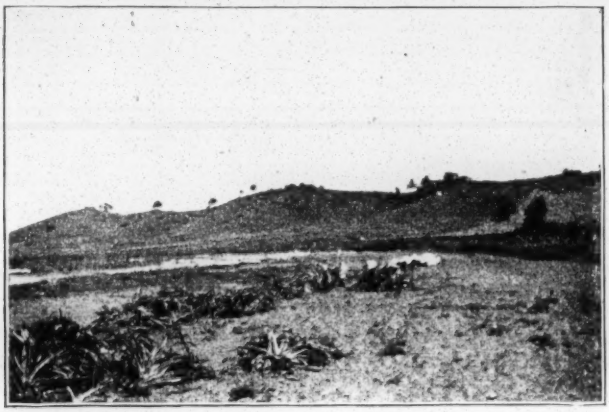
CULTIVATION OF MOUNTAIN SUMMITS

A SUMMIT IN THE SIERRA LUQUILLO

conical or flattened limestone hills, the remnants of a dissected cuesta or sloping plateau. When viewed from the mountains above they look like thousands of large white Sibley tents below. The interior hills of this group, which are most pointed, rise to 1,200 feet above sea-level, although they stand only 300 to 500

feet above the intervening valleys. The extent of this country north of Lares and San Sebastian we were unable to determine from personal study, but it apparently stretched below us to the northern seacoast. By the courtesy of Captain A. C. Macomb, 5th United States cavalry, we present the following interesting sketch of this region from his pen:

"As you look out to the north and northeast from Las Marias the eye sweeps over the valley of the Rio Guacio (Prieto, also Añasco), and the horizon is a hill formation made from the breaking down of a limestone plateau. This is the range of mountains that one strikes north of Lares. The range shows very strongly one mile north of San Sebastian, passes to the northwest, and juts out just north of Aguadilla. The railroad from Mayaguez runs into it at Aguadilla, and its very steep rugged hills of "worm-eaten" limestone are seen to the eastward from the car window.



BANK OF RIO LOIZA, COASTAL PLAIN

The railroad ends at Aguadilla on account of the hill region mentioned. The wagon road from Aguadilla on to San Juan rises rapidly on to the limestone plateau, over a rocky stiff grade; then the country carries the mind back to Texas—the surface gently rolling, sandy, and rocky, no mud, fine pasture sloping seaward (northerly), but reaching the sea in a bold bluff notwithstanding. When my troop struck this new country, free from the everlasting red mud, and were even able to raise a slight dust, a murmur of content rose from the column. The Guajataca cuts a great gash through the plateau, and its west bank is a rocky limestone bluff of 175 feet. By the winding road just east of the river we rise once more to the plateau and soon reach Quebradillas; thence to Camuy over a rocky and sandy road. The road falls gently into Camuy, which is just at the foot of the north face of the plateau, about one-half mile from the north coast. This coast is *generally rocky*, but here its surface is sand over limestone rock. At the sea itself is a range of sand hills 50 feet high—just

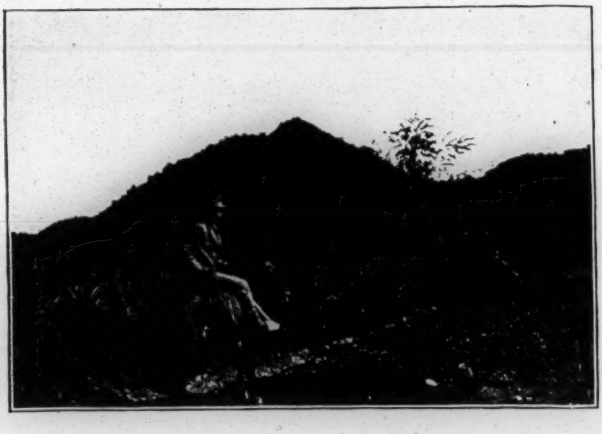
drifted sand—and then a sandy beach, with the sea constantly breaking over the jagged teeth of broken and sunken reefs, here and there close into shore—a rocky rugged island, small and generally verdureless."

The coast-border topography may be broadly conceived as a narrow belt of low hills and plains encircling the main or mountainous mass of the island, and broken in continuity upon the northeast, southeast, and west by spurs of the central mountains which run across it into the sea. This border region of itself is an exceedingly diversified area, presenting two conspicuous major types of relief, coast hills, playa plains, and generally a third type which may be called parting valleys.

Seen from the sea the coast-border topography at the southwest end presents the aspect of a low tilted bench or plain, bluffing rather abruptly at the water's edge, and its summit gently arching toward the foot of the ribbed and corrugated front of the mountains. Here and there a stream from the mountains cuts across this coast bench and severs it into blocks of hills. These stream valleys are wide alluvial plains, frequently of a much greater area than the hills. The hills resulting from the dissection of this bench may be either round or oblong, according to the amount of erosion; but of whatever shape their slopes are always regular and void of the strong vertical corrugations and knife-edged salients which characterize the mountains. They are also distinguished from the interior mountains by their entirely different geologic composition, and on the south coast by their vegetation.

For want of a better word, the term "playa plains" may be used for the wide alluvial plains which sever the coast bench into

HILLS OF COAST BORDER, CAROLINA



A CERRO, SOUTH OF SABANA GRANDE

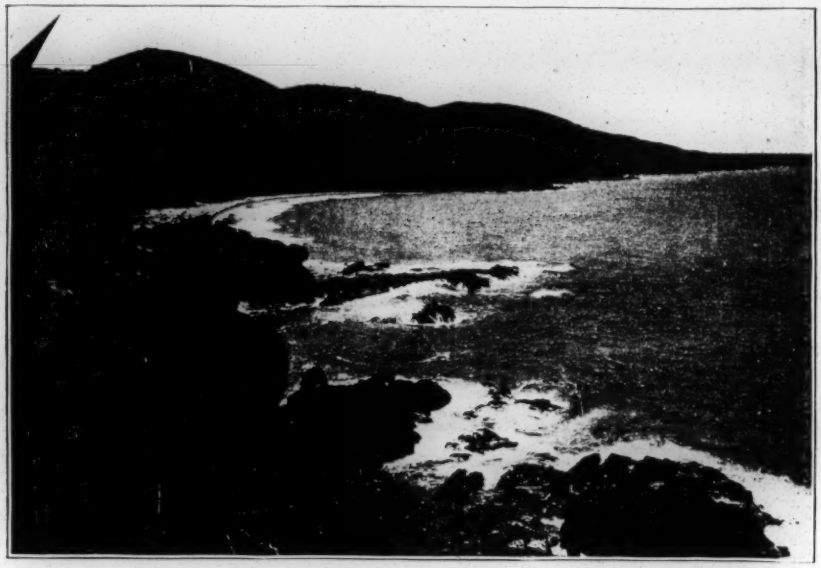
hills and are found at more or less frequent intervals along the entire coast, the borders of which delimit them. I have used the word playa plains for this feature merely as a convenient designation. The word "playa" means literally the shore or strand. Many of the cities of Porto Rico are situated upon the interior border of such plains, where they meet the foothills several miles from the port of entry at the immediate seashore, which is usually designated "playa," in order to distinguish it from the city proper. These plains are fan-shaped in area, with their broader base next to the sea, where they are often many miles in width, and stand only a few feet above the ocean. They are bordered by escarpments composed of the sharp rise of the coast hills, and extend backward up the stream valleys toward the central mountains with gently rising altitude until they pass into a mountain gorge or quebrada. These plains are composed of rich alluvial soil, principally reddish sandy loams, and constitute the sugar lands of the island. These are now what were formerly old alluvial river estuaries, which in late geologic time constituted bays indenting the land, and which have been reclaimed by the general elevation of the island.

These plains are in many cases so extensive that they now far exceed the area of the limestone bench out of which they were originally carved, and in places the surviving hills of the bench are almost entirely removed.

On the north coast the coast hills stand as steeply sloping solitary mounds or domes, rising singly or in chains above wider extents of plain lying between them and the mountain front. The

citadels of San Juan are built upon a hill of this character, others of which rise to the east and west of the city as far as Rio Grande and toward Arecibo. They probably do not exceed 500 feet in height at their interior side toward the mountains, but exact measurements were not made.

On the southwest end of the island there are two parallel rows of hills separated from each other and the interior mountains by long and fertile valleys. The interior chain, which extends from north Cabo Rojo to within three miles of Yauco, passing west of San German, is of a peculiar type not seen elsewhere upon the



COAST HILLS NEAR CABO ROJO

island. It is a single chain of high rounded wooded hills of the type called knobs in this country and cerros by the Spaniards, which owe their configuration to a thick cap stratum of hard mountain limestone of Cretaceous age, the lower portion being composed of the softer tuffs and decomposing rocks of the interior mountains. Where this cap has been removed erosion has widened the valleys into great elongated plains or vegas.

From the southwest cape of Porto Rico to within three or four miles of Ponce, except where occasionally broken by playas, coast hills are finely developed along the shore. These hills, like those of the northwest coast, may be termed a dissected

cuesta—that is, hills which are the remnants of what was once a steeply slanting summit plain. In this particular case the slant is from the central mountains toward the sea, where the hills are in some places terminated by a steep scarp or sea bluff 100 feet in height. The interior scarp of these hills faces the parting valley lying between them and the cerros and central mountains and is occupied by the lake of Guanica.

The playa plains are in places very extensive and in others are exceptional features. They are notably wide along the entire north coast from Arecibo *via* San Juan to the northeast cape; on the west at the mouth of the Añasco north of Mayaguez and south of the same city (the plain of Hormigueras), and along the south coast east of Ponce. Ponce is situated upon a typical playa plain extending for a short distance back of the city up the valley of the Rio Portugues and widening out to the coast. West of Ponce they are exceptional features, but well defined at the mouths of the principal rivers, the limestone bench being more continuous and less broken in this direction.

Similar plains occur at intervals to the eastward of Ponce at Salinas, Guayama, Arroyo, and Jacaboa. Extensive playa plains of this character are also met with on the east coast near Naguabo, Ceiba, and Fajardo, and on the north coast reaching up the valley of the Loiza as far as Carolina.

From San Juan to Camuy, according to Captain Macomb, "the railroad follows the south edge of the coast plain, here and there cutting through a little shoulder. The plain is but a narrow strip until close to Arecibo, when we strike a cane country, the sea to the left one-half mile or more and the mountains some four miles to the south. At Camuy, the railroad terminus from San Juan, the north coast plain is terminated by striking the rising ground of the Pepino hills."

The name "parting valley" I have given to certain long and narrow valleys which sometimes occur where foothills of the limestone bench abut against the front of an elongated mountain range. Certain streams which come from the mountains and cross the lower country tend either to bend along the mountain front as they pass from it or to send out laterals parallel to the same. The erosion attendant upon such phenomena tends to produce long valleys at the junction of the mountains and foothills running parallel to them. Parting valleys of this character are especially well developed on the south side of Porto Rico, such as the plain of Saba Grande and the depression of Guanica

lagoon. The former is a long valley extending east and west between the Cerro Gordo hills and the interior mountains, threaded by the Rio Grande of Mayaguez. Continuous erosion in the future would soon reduce this valley to sea-level and cut off from Porto Rico as an island a long strip of country between the River Susua and Rio Grande. This particular valley is given up almost entirely to the extensive culture of Indian corn.

South of this valley and separated from it by the Cerros is the parting valley of the Laguna de Guanica, extending from near Guayanilla to the port of Cabo Rojo. This is a narrow east-and-west valley nearly at sea-level, lying between the Cerro hills and the narrow rim of coast hills, the latter separating it from the sea. The Laguna de Guanica occupies the east end of this valley, and has outlet to the sea by a narrow passage cut through the limestone hills. Parting valleys of a similar character are developed in many places around the remainder of the island, although perhaps not quite so extensive in area.

The following data will give an idea of the relief of the coast-border topography:

Altitudes of Points along the Southern Coast Border Region

	Feet
Guayanilla, level of the plaza[2]	36
Guayanilla, highest level of the hill of modern limestone surmounting the bay[2]	278
Garganta de la Torre (Pass of the Tower) route from Yauco to Sabana Grande[2]	616
Limestone hills between Ponce and Guayanilla[2]	331
San German, house of Don Ramon[2]	229
Level of the modern shells to the north of the Hacienda de Delgado, north of Cabo Rojo	98
Cabo Rojo, casa de Cabaza[2]	278
Hacienda de Delgado, Cabo Rojo[2]	46
Sabana Grande[2]	305
Level of the superficial deposits of modern shells on the hill situated to the south of the hacienda[2]	314
Mayaguez, level of the plaza[2]	68
Ponce, Hotel de Girl, in the heights of the city[2]	75
Ponce, Moreno Hotel[2]	33
Hacienda la Carlota (Guayama)[2]	141
Coamo-arriba plaza[2]	413
Hot spring of Coamo[2]	190
Coamo-abajo, hotel[2]	29

For references, see footnote on p. 97.

There are several minor and exceptional features in the configuration of Porto Rico which are more developed upon the

other Great Antilles, notably a few interior mountain valleys, the bordering benches of elevated coral reef, the coast lagoons or lakes, and the mangrove swamps.

The interior mountain valleys are not conspicuous or abundant features, nor are they completely closed (without drainage outlets) like those of Jamaica, but are local widenings of the stream-valleys which formerly reached slack water a considerable distance within the marginal area of the mountain mass, when the present coast bench was submerged beneath the sea. The valley of Caguas is the most conspicuous example of this type. This is a wide amphitheater, a considerable distance within the mountain area, and its bottom is filled with old alluvium. It stands at present about 250 feet above the sea.

WEATHERED MOUNTAIN ROCK

Elevated reef benches or soborucco, so abundant in Cuba and forming the narrow coast rim of hard rock protecting a softer interior, thereby producing the excellent pouch-shaped harbors of that island, are but faintly developed in Porto Rico. I saw this material only at the entrance of San Juan harbor, but my studies of the littoral were not extensive. San Juan, Jabos, and Guanica, however, are the only pouch-shaped harbors of Porto Rico, and I believe that their general absence is largely due to the lack of the elevated reef formation.

The coast lagoons or lakes are collections of water in swales of the coastal plain on the north and in parting valleys of the type of that of Guanica, previously described.

Mangrove swamps are extensively developed around the interior margin of San Juan harbor.

It is not my intention to burden this paper with geological detail, but inasmuch as all the cultural and natural aspects are intimately associated with the geologic structure, a few words upon this subject are absolutely essential—in fact, I have seen no region where these phenomena were so intimately related.

The chemical and physical composition of the soils are two of the chief factors producing vegetal differences in the southern United States and tropical America, altitude being next, and rainfall, owing to its general abundance, the least appreciable one. Inasmuch as the soils of Porto Rico, with the exception of that of the playa plains, are all residual—the surface decay of the underlying rock—it is impossible to make a clear presentation of the forestry conditions without presenting a few elementary geological descriptions. The chief and most radical differences in flora (excepting altitude, which is relatively a less important factor in Porto Rico) are those occurring between clay and calcareous soils, especially in the tropics, where the latter is of an open-textured white limestone which abounds from Florida southward, but is not common in the United States.

The mountains are composed largely of black or other dark-colored basic igneous rocks, occurring as tuffs, conglomerates and sills of hornblende-andesite, cut by dikes of diorite. While these rocks are of volcanic origin, there are nowhere any signs of recent or late geologic volcanism, such as craters, unburied lava flows, cinder cones, etc., all original volcanic forms of topography having been destroyed by erosion, to which are due the present features of configuration. Besides, much of this volcanic material has been worked over into sediments in prehistoric ages and now occurs in well defined strata.

Included in this mass of volcanic rocks are two limestone formations, interbedded with them and relatively inconspicuous in area. One of these, found on the crest of the island near Cayey and Aibonito, is a black bituminous shaly limestone interbedded with the volcanic conglomerate. This calcareous horizon is fully 1,000 feet thick, apparently upholds the crest of the Sierra, and weathers into soils noted as the best tobacco lands on the island. The other is a light gray crystalline limestone with Cretaceous fossils (Rudistes). It is seen outcropping on an east and west line from near Cabo Rojo to fifteen kilometers north of Ponce on the Adjuntas road, and has no special agricultural value, but the natural vegetation is always noticeably different where these rocks occur.

VOLCANIC TUFF FORMATION OF THE MOUNTAINS

The upper part of the Pepino hills is made up at their surface of a rather hard lime marl full of coral heads, with occasional indurated strata of firm white porous limestones. These rocks (the Pepino formation) are of Miocene age, as determined by Mr T. Wayland Vaughan from the corals collected by me, similar to certain rocks of Antigua hitherto not known in the geologic sequence of the Great Antilles. Their tilted position, standing at 1,200 feet where they meet the older volcanic mass, testifies to the great geologic movements which have taken place in the West Indies in late geologic time.

Below this limestone, which is at least 100 feet thick, are fossiliferous greensand marls of undetermined age (Eocene or Oligocene), which in turn rest upon a great thickness of thinly stratified reddish lignitic clays and sands of Eocene age (the Richmond formation) which outcrops near San Sebastian, Guatemala, and Mocha on the western end of the island, and near Carolina on the northeast coast.

The south coast hills are composed entirely of chalky or other loose-textured glaring white limestone of a very porous character, often chalky, which was deposited around the margin of the mountainous island mass when it was submerged about 600 feet lower than it stands at present. These are largely of Pleistocene age, although some of the lower strata may be as old as the Oligocene. Their surface is often covered by the peculiar efflorescent calcareous precipitate known in Mexico as tepetate, which forms a shallow subsoil or pan.

The playa plains are composed entirely of alluvium, derived mostly from the mountain formations, but also mixed with the débris of the adjacent white limestone hills, generally reddish in color, except that which is derived from the Pepino hills, which is a black calcareous soil. These extensive alluvial deposits are of a loamy nature, combining essentially the qualities of the residual soils, both of the clay mountains and the calcareous foothills, with the additional advantage of a more loamy physical structure adapted for better drainage and root penetration and general cultivation.

The geologic history of the island may be briefly summarized as follows:

The earliest positive chronology that can be fixed at present is Cretaceous time, when the island, in common with the other Great Antilles, was the site of active volcanism, which resulted in the piling up of vast heaps of igneous rocks now constituting its mass.

At the close of Cretaceous time and during the beginning of the Tertiary this volcanic material was water-sorted and converted into marginal sea sediments, as represented in the stratified tuffs, conglomerates, and fossiliferous Cretaceous and Eocene rocks. The history of Porto Rico during Oligocene time is obscure, the vast thicknesses of white limestone of that age which occur in Cuba, Jamaica, and Santo Domingo not having as yet been detected upon the island. It is supposed, however, that the island, together with the other Great Antilles, suffered great subsidence during this epoch.

In late Tertiary time all the aforesaid rocks were uplifted and deformed into their present mountainous aspect, in common with the general Antillean uplift of that epoch. The exact period of this uplift in the later half of the Tertiary has not as yet been fixed, but it was largely accomplished before the close of the Miocene epoch. The tilted Pinones strata of Miocene age, at the northwest corner of Porto Rico, clearly show that the movement was not completed until after the close of the Miocene. In Pleistocene time the island suffered minor oscillations of elevation and subsidence, resulting in the present erosion and configuration of the coast-border topography.*

*The complicated geologic history of the Great Antilles is set forth in detail by the author in the Bulletin of the Museum of Comparative Zoölogy of Harvard College, which is now in type and will probably be published before this article appears.

The mountain areas present but little, if any, barren indurated rock surface, but are covered with a deep red arenaceous clay soil, to which vegetation clings tenaciously. Decay is so rapid under perpetual warmth and moisture that the volcanic rocks constituting the major area quickly rot and weather. This mountain soil is one of the most marked features of the island, and to it are largely due many of its agricultural and forestal conditions. Were it less tenacious and sticky than it is (and language can hardly convey an idea of the unctuousness of this stickiness, which is especially disagreeable as a road material), the mountain slopes of Porto Rico would now be washed and dreary wastes of barren rock.

Owing to this soil, which clings to its framework, the mountains are cultivated to their very summits, verticality of slope presenting no obstacle to cultivation in the minds of the natives. I have seen the steepest possible slopes cultivated to the highest degree in coffee and tobacco—in fact, the most productive crops of this character are grown upon declivities upon which the American farmer would not risk the danger to life and limb.

As a result of long cultivation, much of the soil of Porto Rico is now abandoned and in the condition known throughout the English-speaking West Indies as "ruinate." This has resulted from overcultivation, from the failure to apply fertilizers, and in some cases from erosion. Land of this character was observed by the writer in many parts of the island. On the north coast, in the vicinity of Rio Grande and Carolina, ruins were seen of what were once houses of extensive sugar estates, the former fields being grown up in grass. In the western part of the island, in the high summit region seen in passing from Adjuntas to Lares, many abandoned fields were observed, which are now entirely denuded of trees and cultivated crops. Considerable areas of ruinate were also observed on the south coast, between Juana Dias and Ponce. The reclamation of these lands by forestization or other methods of scientific agriculture is one of the problems which Porto Rico presents to the civilization of its new owners.

The climate of Porto Rico is being well studied upon the ground by Professor Mark W. Harrington, of the U. S. Weather Bureau, and I shall not attempt to describe it other than to state a few facts concerning its bearing upon the distribution of life and culture. Professor Harrington has already published many

new and interesting facts concerning the climate and its local variation, which will be mentioned in a future article.

The whole island may be divided into a wet and a dry belt, on the north and south sides of the central Cordillera, respectively. The greatest rainfall, which sometimes attains 120 inches a year on the slopes of El Yunque, is at the northeast end. On the south side, from Guayama to Cabo Rojo, the region is dryer, but the whole island is wet in comparison with the standard of the United States. The higher mountains are slightly cooler than the coast belt, but the temperature is so uniformly warm that altitude has but little bearing upon distribution of vegetation. The mountains are constantly bathed in moisture, either by daily rainfalls or dense mists which collect upon them at night, except upon the lower portion of their southern slopes; hence it may be said that the superfice is never dry and the subsoil is constantly saturated in the mountain region.

On the southern coast, however, owing both to the porosity of the limestone, which quickly drains off the moisture, and the generally dryer climate, the surface above has a parched and arid look, especially in the long dry season. Some portions of this south belt are very arid, and great complaint was heard upon the island in places that the rainfall for the past two years had been insufficient for domestic supply. In fact, in order to cultivate the staple crops of the lowlands of the south coast, irrigation is necessary and is practiced with great skill and at considerable cost along the whole southern border from Guayama to Cabo Rojo.

In a subsequent article I shall set forth the economic geography of the island, and show the intimate relation which exists between the configuration and geology, which I have described, and the vegetal conditions—the agricultural, hygienic, and commercial capacities.

NOTE.—In order to meet the wishes of the author, the name of the island treated of in the foregoing article is spelled in the form commonly in use in England and the United States. The form "Puerto Rico" is that commonly used by the people of the island itself and by those of other Spanish-speaking countries, and is good Spanish. It is the form adopted by the U. S. Board on Geographic Names, in accordance with its logical principle of adopting for other countries the names by which they are known to their own inhabitants. The Editors wish it to be understood that in acceding to Mr Hill's request in this trifling matter they are not establishing a precedent.

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